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Office of Intellectual Property Counsel
3M Innovative Properties Company
PO Box 33427
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PATENT
Docket No.
55944USA9A.002

Transmittal of Patent Application - Rule 1.53(b)

Box: Patent Application
Commissioner for Patents
Washington, DC 20231

Inventor(s): Douglas E. Weiss, Douglas S. Dunn and Roy G. Schlemmer
Title: PULSED ELECTRON BEAM POLYMERIZATION

1. ☒ Enclosed is the above-mentioned new patent application. It includes 7 sheet(s) of drawings.
2. ☒ Enclosed is an executed declaration or oath.
3. ☒ Enclosed are an application assignment to 3M Innovative Properties Company and a completed Assignment Recordation Cover Sheet.
4. ☐ Enclosed is a Certified Copy of Priority Document(s) _____. (if foreign priority is claimed).
5. ☐ Enclosed is _____.
6. ☒ The fee for filing the application is computed as follows:

Claims As Filed

(1) For	(2) Number Filed		(3) Number Extra	(4) Rate	(5) Basic Fee $710
Total Claims	22	-20 =	2	x $18	$36
Independent Claims	3	-3 =	0	x $80	$0
Additional fee for filing one or more multiple dependent claims				$270	$0
			Total amount due →		$746

7. ☒ Please charge to Deposit Account 13-3723 any fees under 37 CFR 1.16 and 1.17 which may be required to file and during the entire pendency of this application. This authorization includes the fee for any extension of time under 37 CFR 1.136(a) that may be necessary. To the extent any such extension should become necessary it is hereby requested. A copy of this transmittal letter for fee processing is enclosed.
8. ☒ Enclosed is a return receipt postcard

Respectfully submitted

Registration Number	Telephone Number
46,346	(651)736-6933
Date: May 11, 2001	

Signature
Printed Name: Kimberly S. Zillig

Certificate of Express Mailing

Pursuant to 37 CFR 1.10 I certify that this application is being deposited on the date indicated below with the United States Postal Service "Express Mail Post Office to Addressee" service addressed to: Commissioner for Patents, Washington, DC 20231.

Express Mail Mailing Label No.	Signature of Person Mailing Application
EL597088735US	Stephanie J. Flasch
Date of Deposit: May 11, 2001	Printed Name of Person Mailing Application: Stephanie Flasch

communicating with an on-off switch for the electron beam generator that causes the substrate with the coating of polymerizable composition to remain stationary under the e-beam window until the desired total dose of electron beam energy has been deposited. A second method employs a continuously moving conveyor belt to move the coated substrate under the e-beam window at a speed calculated to deposit the desired total dose of electron beam energy onto the polymerizable composition. A third method moves a continuous web of the polymerizable composition past an array of electron beam generators operated and positioned to provide the desired total dose of electron beam energy across an extended surface area of the web.

Dose

Dose is the total amount of energy deposited per unit mass. Dose is commonly expressed in kilograys (kGy). A kilogray is defined as the amount of radiation required to supply 1 joule of energy per gram of mass.

The total dose received by a polymerizable composition primarily affects the extent to which monomer is converted to polymer and the extent to which the polymers are crosslinked. In general, it is desirable to convert at least 95 wt%, preferably 99.5 wt%, of the monomers and/or oligomers to polymer. However, the conversion of monomers to polymer in a solventless or low solvent system is asymptotic as the reaction progresses due to diffusion limitations inherent in such systems. As monomer concentration is depleted it becomes increasingly difficult to further polymerize the diffusion-limited monomers.

Dose is dependent upon a number of processing parameters, including voltage, speed and beam current. Dose can be conveniently regulated by controlling line speed (*i.e.*, the speed with which the polymerizable composition passes under the e-beam window), the current supplied to the extractor grid, and the rate of the pulses of accelerated electrons. A target dose (*e.g.*, 20 kGy) can be conveniently calculated by the KI=DS equation, where K is the machine constant, I is current (mA), D is dose in kilograys, and S is speed, in fpm or cm/sec. The machine constant varies as a function of beam voltage and cathode width.

Generally, the dose required for full conversion is proportional to the dose